36. A method for identifying compounds that have the activity of inhibiting sister chromatid separation in eukaryotic cells, comprising:

(a) incubating with a test compound a protease, which has separin-like cysteine endopeptidase activity, in the presence of a substrate for its proteolytic activity; and

(b) determining the inhibiting effect of the test compound on the proteolytic activity of the protease.

37. The method of claim 36, wherein said eukaryotic cell is an animal cell.

38. The method of claim 36, wherein said eukaryotic cell is a plant cell.

39. The method of claim 36, further comprising incubating with the test compound, a co-factor of said protease.

40. The method of claim 36, which is high-throughput.

41. The method of claim 36, wherein said protease is recombinant.

42. The method of claim 36, wherein said protease is a plant separin.

43. The method of claim 36, wherein said protease is human separin.

44. The method of claim 36, wherein said substrate is a protein recombinantly produced in baculovirus in the presence of a phosphatase inhibitor.

45. The method of claim 36, wherein said substrate is plant SCC1 or a fragment or variant thereof.

46. The method of claim 36, wherein said substrate is human SCC1 or a fragment or variant thereof.

47. The method of claim 46, wherein said substrate is a polypeptide with the amino acid sequence of SEQ ID NO:1, or a cleavable fragment or variant thereof.

48. The method of claim 36, wherein said substrate comprises a label which generates a detectable signal proportional to the amount of the cleavage product of the proteolytic activity, and wherein the signal is measured in the presence and in the absence of the test compound.

B2 cont.

49. The method of claim 48, wherein said label is fluorescent.

50. An inhibitor of a protease with separin-like cysteine endopeptidase activity as identified by the method of claim 36.

51. The inhibitor of claim 50, wherein said protease is human separin.

52. A method of treatment in a human comprising administering an effective amount of the inhibitor of claim 50 to a human in need thereof.

53. The method of claim 52, wherein said treatment is cancer treatment.

54. The method of claim 52, wherein said treatment is for the prevention of birth defects caused by this mis-segregation of chromosomes in meiosis.

55. The inhibitor of claim 50, wherein said protease is a plant separin.

B2 cont.

56. A method for increasing the ploidy of plant cells comprising administering the inhibitor of claim 55 to a plant in need thereof.

57. A composition comprising the inhibitor of claim 50 as an active ingredient and a pharmaceutically acceptable carrier.